

# A Study on Open Source Automated Test Management

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## Abstract:

**D**igitalization is the buzzword today. Firms irrespective of their size and industrial sector are investing heavily on IT Systems to get transformed into a digital firm. To make the digital transformation happen and to become customer responsive, IT Systems of firms facing the customers as well as their internal backend systems should perform efficiently and should be bug-free. Software Testing is one of the critical activities performed diligently to develop bug-free software. IT Companies developing software invest heavily and spent quality effort in performing testing to deliver bug-free software. It is a quality control activity performed to minimize business risk. Software Test Management is the overall function accountable for testing and Test Managers are responsible to recruit, train and manage a team of testers, prepare & monitor test budgets, build test environment, improve test efficiency, reduce cost of testing and so on. For the past two decades, Test Managers built Test Automation Systems with proprietary testing tools and integrated them with other related systems to improve test efficiency and deliver accurate test results. In the recent past, Proprietary Test Automation Systems are augmented with Open Source testing tools which are bundled with several functionalities and are available for free. This adds value to Test Management by reducing cost without compromising the quality of testing. This paper attempts to provide an insight on the impact of open source automated testing on test management, provides snapshot of the open source tool market and discusses how Open Source automated testing add value to Test Management.

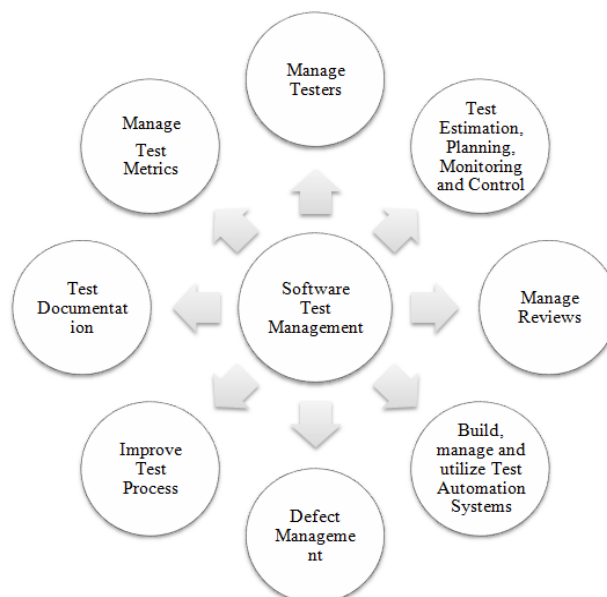
**Keywords:** Open Source Automated Testing, Software Testing, Test Automation, Test Management

## I. INTRODUCTION

The key role of Software Test Management is to manage resources effectively [1]. Resources include People, Software, Hardware, etc. Test Management is a discipline that adds value to the overall success of a Software development project and its success is measured in terms of the success of the project. With Agility and Quality being the mantra for survival, there is an increasing trend in the usage of Test Automation tools to improve efficiency and deliver accurate reports. Test Managers are creating Test Automation team with a blend of people with technical, functional and managerial skills to study the test tool market, evaluate, select and deploy the best tool suited for their test environment. This activity culminates in building Test Automation Systems [TAS] and testers are trained to work on the TAS. By employing TAS, Testers develop, run test scripts, identify defects and get them closed quickly which thereby improves test efficiency.

## II. SOFTWARE TEST MANAGEMENT – AN INTRODUCTION

Software Testing is the process of executing a program or system with the intent of finding errors [2]. In the initial years of Software development, Software Testing was viewed as an integral part of Software development and was performed by Developers.



Later, with the contribution of Glenford Myers, Dorothy Graham, Mark Fewster and several pioneers in testing, the value and significance of testing to improve software quality is well - appreciated by industry and testing has evolved to be a unique discipline. Testing is recognized to be a specific skill and testers are recruited, nurtured and managed by Software Test Managers.

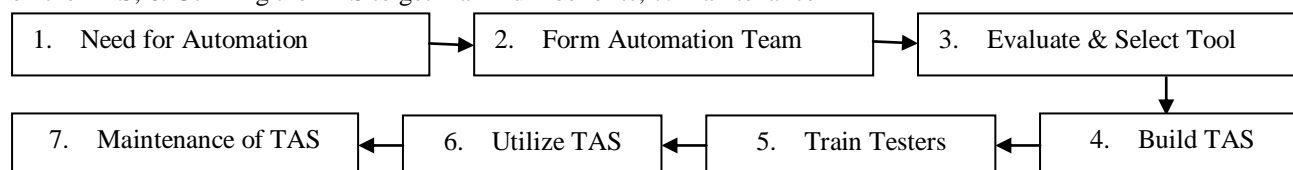
Apart from managing team of testers, some of the other salient functions of Test Management include Test Estimation, planning, monitoring and control, managing reviews, motivating testers and enhancing their skills, Selection of test tool and build Test Automation Systems, Defect management, improving the test process, etc. Some of the other functions include Risk based testing, Test documentation and Manage Test Metrics, etc.

### III. TEST AUTOMATION AND ITS ROLE IN TEST MANAGEMENT

One of the crucial functions of test management is to improve test efficiency and this can be accomplished by utilizing Test Automation tools. Automation tools are widely used to improve the speed of test execution, get accurate test results and generate quick test reports. Software Test Automation is the use of computer aided software engineering tools to help improve the efficiency of test development and execution [3]. The benefits of test automation include high reusability, repeatability, improve product quality by test coverage, provide more confidence in quality of product, save time and cost [4]. Though implementation and maintenance cost are high during the initial stages, automation benefits in the long run and helps test management in reducing cost, time with improvement in quality [5]. While Manual Testing is tedious, time consuming and requires more investment in human resources, ROI on automation is directly related to the tests selected for automation [6] and helps reduce cost and improves speed of test execution.

### IV. BUILDING TEST AUTOMATION SYSTEMS – THE PROCESS

Test Managers are responsible for building Test Automation Systems. In general, any software will be tested manually for its first version and slowly the repetitive manual test cases are identified to get automated. Automation helps in performing regression testing efficiently, saves time and cost. Regression testing is the process of assuring programs not adversely affected by unintended modifications by running them over existing regression test suites [7]. The typical process of building TAS comprises of the following steps: 1. Identifying the need for test Automation; 2. Formulation of Test Automation team guided by Test Manager; 3. Evaluating the tool market and selecting the test automation tool that meets the requirement; 4. Implementing the tool by building the TAS; 5. Provide training to testers on the TAS; 6. Utilizing the TAS to get maximum benefits; 7. Maintenance



### V. IMPACT OF OPEN SOURCE TESTING TOOLS ON TEST AUTOMATION SYSTEMS

In the past two decades, proprietary automation tools were ruling the market and were offering several features to improve testing. Some of the leaders in proprietary test tool market include Mercury (acquired by HP), Microsoft, IBM, Oracle, Borland, etc. In the recent past, Open Source test automation tools are well recognized by industry and they are widely used in par with proprietary test automation tools. Open source tools provide all the features available in proprietary tools, a community of professionals are available to provide support and the tools are available for free [8]. Many Open Source automation tools are available in market to perform testing of applications belonging to various technologies like web, windows, packaged applications like ERP, etc., There is a huge impact of Open Source testing tools in building TAS. With Gartner [9] and Forrester [10] acknowledging the fact that Open Source testing tools have got established in the testing world, most of the companies started augmenting their proprietary TAS with Open Source tools. Test Managers have started training their existing testers on Open Source tools and started recruiting new testers with skills in working with Open Source Automation tools.

### VI. OPEN SOURCE AUTOMATION TOOL MARKET

Open Source Automation tool market is market in which testing tools are available free of cost and the source code of the tools are available for modification/customization. Support is also available for these tools from Open Source development community. Gartner in their report on Automation tools forecast that Open source automation tool - Selenium WebDriver will become the de-facto standard for test execution for web testing and projects that the future is complemented with open source. With more and more agile development happening, the adoption of open source testing tools are getting is gaining momentum.

Some of the drivers for the growth of open source testing tool market include affordability, availability, user friendliness, reliability, smooth integration with other tools & no lock-in period. Te most popular open source software test automation tools in the market include Selenium, Geb, Watir, Sahi, Cucumber, Tellurium, etc.

### VII. OPEN SOURCE AUTOMATED TESTING – ADDING VALUE TO TEST MANAGEMENT

Test Management is a discipline focusing on improving quality of system under test with low cost. Traditionally, automation has helped test management to speed up test execution, provide accurate test results and

execute tests 24\*7. It enhanced executing regression tests and with continuous integration tools, test and development environment were tightly integrated. But the disadvantage of such an integrated environment was that the test tools were proprietary and ransom amount was paid to maintain it. With the advent of Open Source testing tools and their availability for no cost has helped test management to be more cost effective and test managers are building their TAS with Open source augmenting proprietary tools. For less critical applications and for systems where clients are fine to test with Open source tools, today's TAS are heavily dependent on Open Source automation tools which adds value to test management by reducing cost and providing reliable test environment.

#### **VIII. CONCLUSION**

By building Test Automation Systems with Open Source testing tools augmenting proprietary tools, test managers are able to reduce cost without compromising the quality of testing. Open Source Automated Test Management has now become reliable, efficient and cost effective solution and IT Companies are gaining maximum advantage by adopting them. Test Managers are recruiting professionals possessing expertise on open source testing tools. Even commercial tools vendors developing open source tools are providing integration features to accommodate open source testing tools. In nutshell, Open source Automated test management is a cost effective and highly reliable solution to build quality Information systems for today and tomorrow.

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